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| Case study title: | Development of new mathematical models for assessment of damages in vulnerable communities affected for the action of natural hazards. |
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| Case study emphasis: | Assessment of damages for the action of natural hazards in vulnerable communities – Mitigation and disaster response. |
| Summary: | <p>Development of new mathematical models for assessment of damages in vulnerable communities affected for the action of natural hazards.</p> <p>With this study, we developed a Software in Visual C++ called “EDES 4.0” to help us to make the assessments. This project was developed with the advising of the Colombian National University and the Colombian Red Cross.</p> |

Date that model application was completed: 2001 - 2002.

Case study geographical location: Colombia in the most vulnerable communities in the north and in the south region of the country.

Vulnerability assessment indicators:

Damages in buildings, health centers, educational centers, recreational points, aqueduct, electrical and telephone lines based in historical damages in the past and the capability of prevention, reduction, response and recuperation of the vulnerable community affected in disasters for natural hazards.

Methodology data requirements:

- Economic capability.
- Population and density.
- Educational level.
- Quality in buildings.
- Some additional information like maps, historical damages in the past, actual local development programs in the region.

Direct participants in the application of the model of the vulnerability assessment:

Local and Subnational (regional) Governments
Multilateral Development Agency
Non Governmental Organization
Research/Training Institute

Economic and Social Sector participants directly involved:

National Government.
Regional and local Government.
NGO's.
Academical sector and Universities.
Advisors firms in management in natural disasters and hazards.

Methodology objective:

To develop a new mathematical model with the most important topics and variables of the vulnerable communities affected with natural hazards based in historical damages in the past and the use of new assessment techniques like neural networks, statistical analysis and the use of computers.

Methodology output:

With the use of this methodology and the new mathematical models, the output is a set of probable quantities in damages in buildings, health centers, educational centers, recreational points, aqueducts, electrical and telephones lines. And an assessment of the internal product of this country after the disaster for a natural hazard.

Results of methodology application at case study site:

- A software for assessment of damages in vulnerable communities affected for natural hazards.
- A system to assessment that consider the most important variables of vulnerability in communities affected for natural hazards.

Lessons Learned:

- Better use of statistical information of damages produced for the action of natural hazards over vulnerable communities.
- A good interaction between the vulnerable communities, the NGO's like Colombian Red Cross, the government, the Response and Prevention National System and the academical sector like Colombian National University.